Japanese Patent Application Laid-Open No. 63-224944

Specification

1. Title of the Invention

Process for producing multilayered film

2. Claims

(1) A process for producing a multilayered film characterized in that upon laminating an ethylene-ethyl acrylate-maleic anhydride terpolymer on a fluorine resin via an ethylene-glycidyl methacrylate-vinyl acetate terpolymer, said three kinds of resins are simultaneously extruded according to a co-extrusion method.

(2) The process for producing a multilayered film as claimed in claim 1, wherein the fluorine resin is a trifluorinated ethylene chloride resin or a copolymer thereof.

3. Detailed Description of the Invention

[Field of Industrial Application]

The present invention relates to a process for producing a multilayered film that is to be a moisture-resistant film for sealing an electroluminescence device (hereinafter, referred to as an EL device).

[Prior Art]

Recently, an EL device has been used for the back light of a liquid crystal display, an illumination, an indication light or the like, as a sheet light source, and its use has been increasing noticeably. The life of the EL device is influenced by moisture invaded from outside. Therefore, a moisture absorption layer for protecting the EL device from invaded moisture is provided, and a trifluorinated ethylene chloride resin (hereinafter, abbreviated as PCTFE) film is provided as the outermost layer for sealing. The PCTFE film has low adhesion and, therefore, the sealing is made through an adhesion layer. However, since the adhesion strength is not satisfactory, a long life EL device has not been obtained up to now. Further, the PCTFE is also required to be sufficiently adhered with the moisture absorption layer, i.e., a polyamide resin layer, present inside thereof with ease. Thus, it has become apparent that the adhesion force among respective layers, i.e., the PCTFE, the adhesion layer and the moisture absorption layer, is extremely important.

For obtaining desired adhesion, a surface treatment is applied to the PCTFE film, and the adhesion layer is provided

thereon. However, the corona discharge treatment, which is the simplest surface treatment, is not sufficient for surface activation, so sputtering treatment is sometimes adopted. However, the sputtering treatment is disadvantageous in that in spite of using an expensive device, the processing is slow and thus the treatment may be costly.

[Object of the Invention]

For obtaining high moisture resistance which has never been achieved by a conventional moisture-resistant film, the present inventors have conducted extensive study regarding a new fluorine resin multilayered film. As the result, it has been found that the lamination of two kinds of modified ethylene terpolymer as adhesion layers greatly increases the adhesion strength between a fluorine resin layer and one adhesion layer and between another adhesion layer and a moisture absorption layer of an EL device, and various methods have been examined as the lamination method. As the result, it has been found that when three kinds of resins including the fluorine resin are simultaneously extruded according to the co-extrusion method, the fluorine resin and ethylene-glycidyl methacrylate-vinyl acetate terpolymer (hereinafter, abbreviated as an EGV resin) are strongly heat-sealed with each other, which has never been attained by a conventional method. Further extensive investigation regarding the construction and the production conditions of the multilayered film has been conducted, and finally, the present invention has been achieved.

[Configuration of the Invention]

The present invention resides in a process for producing a multilayered film characterized in that upon laminating an ethylene-ethyl acrylate-maleic anhydride terpolymer (hereinafter, abbreviated as an EEM resin) on a fluorine resin via an EGV resin, the foregoing three kinds of resins are simultaneously extruded according to a co-extrusion method.

The fluorine resin used in the present invention is not particularly limited as long as it can be thermally melt-molded. However, for sealing an EL device requiring moisture resistance, PCTFE is preferably used.

PCTFE is a trifluorinated ethylene chloride copolymer comprising a trifluorinated ethylene chloride homopolymer and a copolymerizable ethylenically unsaturated monomer. The content of the ethylenically unsaturated monomer included in the trifluorinated ethylene chloride copolymer is from 0.2 to 20% by weight. When the content is more than this range, the moisture resistance of the trifluorinated ethylene chloride copolymer is deteriorated. For keeping an excellent moisture resistance, the content is desirably 5% by weight or less.

The production process according to the present invention will be described by way of drawings. (1) of Figure 1 is a co-extrusion sheeting die, and (2) to (4) are cooling rolls. A fluorine resin, an EGV resin and an EEM resin are joined together in the die (1) and are co-extruded. The co-extrusion sheeting die can be either a multimanifold die or a feedblock system (combination of a feedblock and a monolayer die). Some fluorine resins have a melting point fairly different from those

of the EGV resin and the EEM resin, and in such a case, an apparatus capable of effecting co-extrusion with giving a temperature difference to each layer such as a vane die manufactured by Cloeren Inc. (U.S.A.) can be used.

The EGV resin (6) is required to be laminated on the PCTFE layer (5). This is because the EGV resin shows strong adherence to the PCTFE film compared with any other thermoplastic resins.

Further, the reason why the EEM resin (7) is laminated on the EGV resin (6) is because, as the moisture absorption layer provided on the EL device, a polyamide resin is commonly used and the EEM resin (7) shows strong adherence to the polyamide resin at a lower temperature compared with a conventionally used ionomer resin or adhesion resin.

[Effects of the Invention]

The advantage of the use of the multilayered film of the present invention as a moisture-resistant film for sealing an EL device is more than longer life of the EL device owing to its stiff adherence. Further, PCTFE may readily become brittle because of the crystallization caused by heat history, and the shortened process in case of using the co-extrusion can reduce the heat history, which also gives good influence on the prolongation of the life of the EL device. Still further, in the co-extrusion, the production can be achieved through one step without requiring a conventional surface treatment step, lamination step or the like, so the production cost can be greatly reduced by the present invention. The cost of the EL device is greatly influenced by the cost of the moisture-

resistant film for sealing, and therefore, the present invention can considerably contribute to the cost performance of the EL device so that the EL device is used more widely.

[Embodiments]

PCTFE (Daiphron M300P manufactured by Daikin Industries), an EGV resin (Bondfast 7B manufactured by Sumitomo Chemical Co. Ltd.) and an EEM resin (Bondine AX 8060 manufactured by Sumitomo Chemical Co. Ltd.) were co-extruded by means of a three-layered multimanifold die in such a manner that the EGV resin contacts with the PCTFE, to obtain a three-layered film having a thickness of 200 μm including a PCTFE layer having a thickness of 150 μm, an EGV resin layer having a thickness of 25 μm and an EEM resin layer having a thickness of 25 μm. The adhesion force among respective layers was so strong as to rupture the film, so it could not be measured.

4. Brief Description of the Drawings

Figure 1 is a sectional view showing the production process of the multilayered film of the present invention; and Figure 2 shows a sectional view of the multilayered film obtained according to the present invention.